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ENDANGERED SPECIES

Technical Bulletin

Department of the Interior, U.S. Fish and Wildlife Service, Washington, D.C. 20204

Mercury Contamination: Another Threat to the Florida Panther

Dennis Jordan
Florida Panther Coordinator
Florida Cooperative Fish and Wildlife Research Unit

One of the Nation's most critically endangered animals, the Florida panther (*Felis concolor coryi*) is believed to number only 30 to 50 animals in the wild. Habitat loss, a reduction in the prey base, and the killing of panthers by people led to this subspecies' decline. Recently, information has emerged that indicates another potentially serious threat: contamination from mercury, a toxic metal. Extremely high levels of mercury—over 100 parts per million (ppm)—have been found in the liver of a panther that died in the Everglades last summer. Until her death in July, the 4-year-old female (known to researchers as #27) had been radiotracked by Everglades National Park personnel daily for about 15 months.

Interest in mercury contamination issues has been growing in Florida over the past year. In 1989, the Florida Department of Health and Rehabilitative Services issued area-specific human health advisories regarding the consumption of fish. The current U.S. Food and Drug Administration action level for mercury in fish is 1.0 ppm, and concentrations as high as 4.4 ppm have been documented in largemouth bass (*Micropterus salmoides*) fillets from sites in southeast Florida.

Samples from one section of Everglades National Park exceeded 1.5 ppm. Collections by the U.S. Fish and Wildlife Service in 1989 from Loxahatchee National Wildlife Refuge were found to range from 0.5 to 1.5 ppm. Appropriate health advisories were issued for the refuge and park in conjunction with Health and Rehabilitative Services.

Concern is focusing on finding the source of the mercury contamination problem in Florida, which is not limited to the southern part of the State. In other States, pulp and paper plants, chor-alkali plants, and coal-fired power plants have been implicated. These sources, however, evidently are not a problem in Florida. While no generally accepted explanation has surfaced, a hypothesis was suggested in a December 1989 report released by the Technical Subcommittee of the Florida Panther Interagency Committee. (The Committee, formed in 1986, includes representatives from the U.S. Fish and Wildlife Service, National Park Service, Florida Game and Fresh Water Fish Commission, and Florida Department of Natural Resources.) Its report suggests that the mercury could be coming from a natural source: the peat and muck soils that are common throughout Florida. These often flooded and highly anaerobic soils provide a suitable environment for the methylation of inorganic mercury.

Fish and Wildlife Service photo

The Florida panther once occurred throughout Florida and from eastern Texas or western Louisiana through Arkansas, Mississippi, Alabama, Georgia, and parts of Tennessee and South Carolina. Today, however, it is believed to survive only in remote parts of south Florida.

Methylmercury, a product primarily of anaerobic bacteria, is the biologically active and toxic form of mercury; inorganic mercury, on the other hand, is considered to be biologically innocuous. The slow oxidation of peat and muck soils by burning, draining, or other disturbances provides an avenue for methylmercury to enter the food web, where this contaminant accumulates in the predators of aquatic animals. While no research has yet been conducted in Florida to verify this hypothesis, studies in Finland, a country with one-third of its land covered in peat soil, have traced mercury contamination to various types of surface disturbances.

Concern about mercury contamination had not been directed toward Florida panthers until the death of #27. A necropsy showed no obvious cause of death, but subsequent screening for selected pesticides and heavy metals by a laboratory under contract to the Service

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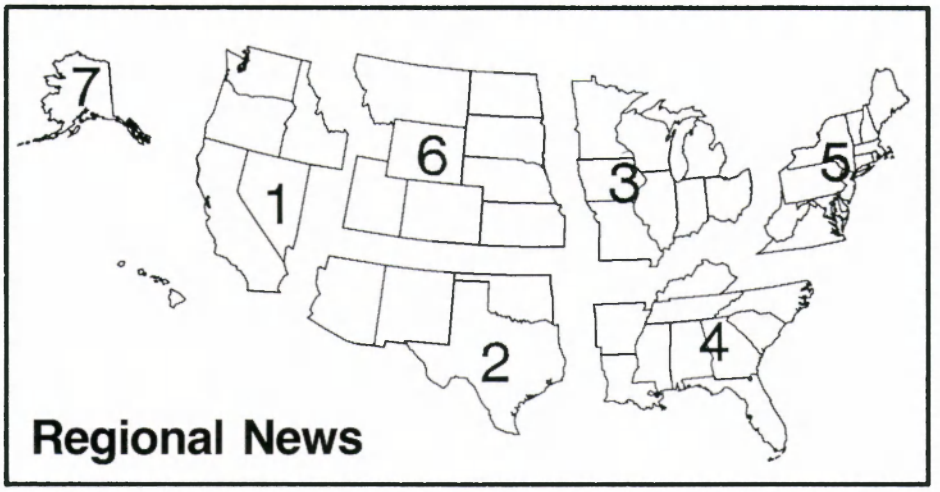

Regional News

Regional endangered species staffers have reported the following news:

Region 1—The Fish and Wildlife Service's Sacramento, California, Field Station staff responded to a request from the Federal Energy Regulatory Commission (FERC) for reinitiation of formal consultation under Section 7 of the Endangered Species Act for the Mojave-Kern River-WyCal Pipelines. Three natural gas pipelines are being proposed by the applicants, two coming from Wyoming and the other from Arizona. They would converge in the Mojave Desert and cross the Tehachapi Mountains, ending in Kern County, California.

The Service had originally consulted with FERC on the pipelines in August 1987, resulting in a Biological Opinion that the project, as proposed, would jeopardize the clay phacelia (*Phacelia argillacea*), Uinta Basin hookless cactus (*Sclerocactus glaucus*), spineless hedgehog cactus (*Echinocereus triglochidiatus* var. *inermis*), San Joaquin kit fox (*Vulpes macrotis mutica*), giant kangaroo rat (*Dipodomys ingens*), blunt-nosed leopard lizard (*Gambelia silus*), and desert tortoise (*Gopherus agassizii*). After implementing the "reasonable and prudent alternatives" specified in the jeopardy opinion, the pipeline companies applied to FERC to amend portions of the original pipeline proposal. Since the original Biological Opinion was issued, the Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*) was listed and the Mojave population of the desert tortoise was emergency-listed by the Service. In light of these changes, FERC has reinitiated Section 7 consultation on the pipelines. The Service's Sacramento Office is evaluating the effects of the pipelines and negotiating with the companies to mitigate impacts to the listed species. It will issue a revised Biological Opinion on the pipelines later this year.

* * *

In response to requests from local government planning agencies, development companies, and other groups, the Service's Laguna Niguel and Ventura (California) Field Stations have prepared 1:100,000-scale maps showing their best estimate of the current distribution of desert tortoises in California. These maps are intended to assist all affected parties in avoiding the potential take of this Endangered species. Narratives also were prepared to interpret the maps and provide recommendations on what kind of surveys would be appropriate to determine if tortoises are present on any given parcel of land.

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The U.S. Coast Guard has initiated formal Section 7 consultations with the Service on the potential effect of proposed shipping lanes off the California coast on southern sea otters (*Enhydra lutris nereis*). After a December 5, 1989, meeting with the Service, the Coast Guard has agreed to provide data on the oil spill risk from the proposed lanes and develop a hypothetical lane with a 99 percent probability of oil spills not reaching the shore. Consequently, the consultation process has been placed on hold until the information is available.

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U.S. Fish and Wildlife Service
Washington, D.C. 20240

John Turner, *Director*
(202-343-4717)
Ralph O. Morgenweck
Assistant Director for Fish and Wildlife Enhancement
(202-343-4646)
William E. Knapp, *Chief, Division of Endangered Species and Habitat Conservation*
(703-358-2161)
Marshall P. Jones, *Chief, Office of Management Authority*
(703-358-2093)
Clark R. Bavin, *Chief, Division of Law Enforcement*
(703-358-1949)

TECHNICAL BULLETIN
Michael Bender, *Editor*
(703-358-2166)

Regional Offices

Region 1, 1002 N.E. Holladay St., Portland, OR 97232-4181 (503-231-6118); Marvin Plenert, *Regional Director;* Robert P. Smith, *Assistant Regional Director;* Bob Ruesink, *Endangered Species Specialist.*

Region 2, P.O. Box 1306, Albuquerque, NM 87103 (505-766-2321); Michael J. Spear, *Regional Director;* James A. Young, *Assistant Regional Director;* Steve Chambers, *Endangered Species Specialist.*

Region 3, Federal Bldg., Fort Snelling, Twin Cities, MN 55111 (612-725-3500); James C. Gritman, *Regional Director;* Gerald R. Lowry, *Assistant Regional Director;* Ronald L. Refsnider, *acting Endangered Species Specialist.*

Region 4, Richard B. Russell Federal Bldg., 75 Spring St., S.W., Atlanta, GA 30303 (404-331-3580); James W. Pulliam, *Regional Director;* David Flemming, *Endangered Species Specialist.*

Region 5, One Gateway Center, Suite 700, Newton Corner, MA 02158 (617-965-5100); Ronald E. Lambertson, *Regional Director;* Ralph Pisapia, *Assistant Regional Director;* Paul Nickerson, *Endangered Species Specialist.*

Region 6, P.O. Box 25486, Denver Federal Center; Denver, CO 80225 (303-236-7920); Galen Buterbaugh, *Regional Director;* Robert E. Jacobsen, *Assistant Regional Director;* Larry Shanks, *Endangered Species Specialist.*

Region 7, 1011 E. Tudor Rd., Anchorage, AK 99503 (907-786-3542); Walter O. Stieglitz, *Regional Director;* Rowan Gould, *Assistant Regional Director;* Ron Garrett, *Endangered Species Specialist.*

Region 8 (FWS Research and Development nationwide), Washington, D.C. 20240; John D. Buffington, *Regional Director;* Al Sherk, *Endangered Species Specialist (703-358-1710).*

U.S. Fish and Wildlife Service Regions

Region 1: California, Hawaii, Idaho, Nevada, Oregon, Washington, American Samoa, Commonwealth of the Northern Mariana Islands, Guam, and the Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico and the U.S. Virgin Islands. **Region 5:** Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska. **Region 8:** Research and Development nationwide. **Region 9:** Washington, D.C., Office.

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Fish and Wildlife Service Undertakes Review of the Bald Eagle's Status

The Nation's symbol, the bald eagle (*Haliaeetus leucocephalus*), has received a great deal of attention since it was listed as one of the Nation's first Endangered species in 1967. The decline of this magnificent bird was traced to many factors, including habitat loss, disturbance of nest sites, and illegal shooting, but the greatest problem was environmental contamination by the organochlorine pesticide DDT. With the banning of DDT in 1972 and the efforts of Federal, State, and private agencies to protect eagles and their habitat, the species' numbers have increased from an estimated 400 nesting pairs in the 48 conterminous States in the early 1960's to over 2,660 nesting pairs in 1989. Currently, the eagle is still listed as Endangered in 43 States and Threatened in Washington, Oregon, Minnesota, Wisconsin, and Michigan.

In four of the five bald eagle recovery regions in the United States (i.e., Pacific Northwest, Southwest, Northern States, and Chesapeake Bay), the eagle has reached the goals in the respective recovery plans for reclassification from Endangered to Threatened. Eagle populations also have increased in the fifth recovery region, the Southeast, although the distribution of eagles over the 12 States involved is not yet satisfactory.

With the dramatic increase in bald eagle numbers, the Fish and Wildlife Service believes it is time to conduct a comprehensive review of the species' status and determine whether or not it should be proposed for reclassification from Endangered to the less critical Threatened category throughout its range. Before proposing such a change, however, the Service wants to be sure that it has the most up-to-date information available. Consequently, a notice of intent was published in the February 7, 1990, *Federal Register* to solicit additional information. The Service will review comments on this notice and the 1990 bald eagle breeding data before deciding on a reclassification proposal.

It is important to emphasize that the Service is not considering removing the bald eagle from the Endangered and Threatened Species List. Even if the species is reclassified to Threatened, bald eagles and their habitat would continue to receive protection under the Endangered Species Act, as well as two other Federal laws, the Eagle Protection Act and the Migratory Bird Treaty Act. Anyone taking, attempting to take, or otherwise illegally possessing a bald eagle or eagle products without a permit would be subject to the same penalties now in force. Section 7 of the Act also would continue to protect this species from Federal actions that could jeopardize its survival. The Service will continue to work with Federal and State agencies and private groups to seek full recovery of the bald eagle.

photo by Mike Lockhart

The status of the bald eagle has improved since the use of DDT was curtailed, but pressure on its habitat is a continuing concern.

Bald eagles in Alaska and Canada, where the species is considered relatively plentiful, are not listed as Endangered or Threatened. They are protected, however, by the Migratory Bird Treaty Act and, in Alaska, also by the Eagle Protection Act.

Listing Approved for Price's Potato-bean

The first final listing rule published in 1990 classified Price's potato-bean (*Apios priceana*) as a Threatened species. A member of the pea family (Fabaceae), this twining perennial vine grows up to 15 feet (5 meters) in length, has pinnately compound leaves, and bears greenish-white to purplish-pink flowers. It historically has been reported from 21 sites in 5 States, but apparently it survives at only 13 disjunct sites in Alabama (3 populations), Kentucky (3), Mississippi (4), and Tennessee (3). Only 5 of these sites support 50 or more plants, and the remaining sites have no more than 30 plants each. Most of the populations occur on privately owned land, and many are declining. The survival of this species is threatened by habitat modification and loss due to cattle grazing/trampling, clearcutting, road improvements or right-of-way maintenance activities (such as herbicide application), urbanization, and vegetative succession.

The Service proposed listing Price's potato-bean as Threatened in the May 12, 1989, *Federal Register* (see BULLETIN Vol. XIV, No. 6), and the final rule was published January 5, 1990.

10 Foreign Animals Proposed for Listing as Endangered

Ten foreign animal species—four monkeys and six birds—were proposed by the U.S. Fish and Wildlife Service on January 16, 1990, for listing as Endangered species. If the proposals are approved, these animals will receive the protection available to foreign taxa under the Endangered Species Act.

The four snub-nosed monkeys or langurs, all in the genus *Rhinopithecus*, occur in eastern Asia. In size, these animals range from 20 to 33 inches (51 to 83 centimeters) in head and body length, and 20 to 38 inches (51 to 97 cm) in tail length. They usually inhabit high mountain forests but many descend to lower elevations in winter. All four species are considered among the most critically endangered primates in the world.

The four monkey species included in the listing proposal are:

- **Sichuan** or **golden snub-nosed monkey (*R. roxellana*)**—found on the southeastern slopes of the Tibetan Plateau in the Chinese provinces of Sichuan, Shaanxi, Hubei, Gansu, and Yunnan.
- **Yunnan** or **black snub-nosed monkey (*R. bieti*)**—occurring in the Yunling Range of Tibet and Yunnan.
- **Guizhou** or **gray snub-nosed monkey (*R. brelichi*)**—native to the Fanjin Range in the Chinese province of Guizhou.
- **Tonkin snub-nosed monkey (*R. avunculus*)**—found in northern Viet Nam.

The range and numbers of all four species have been reduced substantially in recent years. Hunting of these animals to obtain food, pelts, and parts for medicinal purposes has been one factor in their decline. The most serious problem, however, is habitat loss, especially forest destruction due to slash-and-burn agriculture. One species, *R. avunculus*, also probably suffered losses from military activity during the Viet Nam War. This monkey was listed in 1976 as Threatened, but a reclassification to the more critical category of Endangered would reflect its increasingly vulnerable status.

The bird species recently proposed for listing as Endangered include:

- **northern bald ibis (*Geronticus eremita*)**—This species, also known as the hermit ibis or waldrapp, measures about 30 inches (75 cm) from the end of its tail to the tip of its curved beak. It has a completely naked head, red legs and beak, and generally dark plumage. The northern bald ibis originally had a very wide distribution, occurring across much of southern Europe, northern Africa, and southwestern Asia. Extensive habitat modification, pesticide applications, human disturbance at nesting sites, and hunting have eliminated this species from Europe and reduced its known range to a few small populations in Morocco and one in Turkey. The single greatest threat to the remaining birds is believed to be pesticide pollution, to which this species is extremely susceptible.
- **white-winged guan (*Penelope albipennis*)**—Reaching a length of up to 28 inches (70 cm), this bird is generally brown in color but has white outer primary feathers. It is endemic to a small part of extreme northwestern Peru. Unfortunately, its habitat is rapidly being destroyed through the burning of forests to produce charcoal. There are believed to be no more than 100 birds remaining.
- **cheer pheasant (*Catreus wallichii*)**—This species is similar in size and proportions to the common ring-necked pheasant (*Phasianus colchicus*), but lacks the pronounced markings. The cheer pheasant is generally light brown and has a large crest of feathers on the back of its head. It originally was found in the Himalayan foothills of Pakistan, India, and Nepal. The modification of its forest and meadow habitat for agriculture has reduced its distribution to small, fragmented populations. These sedentary birds are said to be relentlessly persecuted by poachers.
- **red-tailed** or **blue-cheeked parrot (*Amazona brasiliensis*)**—A colorful bird, this species is green with a red crown, a blue throat and upper breast, bluish-purple cheeks, and a tail with yellow lateral feathers and a red patch. It is about 15 inches (37 cm) in length. Red-tailed parrots occur in the coastal forests of southeastern Brazil, which have been largely destroyed in recent decades by human development. The illegal collection of these birds for the pet trade is another threat.
- **Norfolk Island parakeet (*Cyanoramphus novaezelandiae cookii*)**—The plumage of the Norfolk Island parakeet is mainly green, but the top and sides of the head are red and the outer webs of the tail feathers are violet-blue. It measures about 11 inches (28 cm) in length. As its name indicates, this subspecies is endemic to Norfolk Island, a 14 square mile (35 square kilometer) Australian possession between New Zealand and New Caledonia in the southwestern Pacific. Its decline has resulted from a number of factors, including the destruction of forest habitat, competition and diseases from introduced bird species, predation by introduced rats and cats, and persecution as an agricultural pest. With only about 20 surviving individuals, the Norfolk Island parakeet is among the world's most critically endangered birds.
- **Madagascar red owl (*Tyto soumagnei*)**—Related to the common barn owl (*Tyto alba*) of North America, but much smaller, this species reaches only about 9 inches (23 cm) in length and is mostly reddish in color. Its range in the rainforest of eastern Madagascar is being cleared for agriculture and is subject to other human impacts. Its numbers are not known but are believed to be very low. Only a few specimens have been collected, the most recent in 1934. A single individual also was reported in 1973.

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The above monkeys and birds are already on Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which restricts commerce in rare animals and plants. Listing them under the Endangered Species Act would reinforce the prohibition on U.S. import or export of these species without a permit. The Act also authorizes the Service to assist foreign wildlife management agencies in the conservation of listed species by providing training, personnel, and (if available) limited funding.

Regional News

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On January 3, 1990, three female Andean condors (*Vultur gryphus*), W-8, W-9, and W-10, were released from a new hack site in the backcountry of Ventura County, California. Within 3 hours of their release, all three birds had attempted to fly. W-8 was the first to attempt to interact with the older Andean condors, which were released about a year ago. After joining them in a soaring flight, she quickly tired, lost altitude and dropped into the chaparral about 660 feet (200 meters) from the release platform. W-8 used a series of short flights over the course of several days to return to her release site. The other two condors are successfully performing short flights around the release platform.

The four Andean condors released last year are all doing well and have integrated with the newly released condors. Three more Andean condors are being acclimated at the hack site and are scheduled for release soon. Like all of the Andean condors released so far, these birds have been tagged with radio transmitters. The purpose of these temporary releases has been to test techniques for the eventual reintroduction of native California condors (*Gymnogyps californianus*).

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The Central Idaho Wolf Recovery Steering Committee met December 5-6, 1989, in Missoula, Montana, with the Northwest Montana Wolf Recovery Group. John Gunson, from the Alberta Wildlife Department, described the experience of the Alberta, Canada, gray wolf

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Studies Under Way to Recover Two Conasauga River Fishes

K. Winkler, M. Freeman, and B. Freeman
Institute of Ecology/Museum of Natural History
University of Georgia, Athens

The amber darter (*Percina antesella*) and the Conasauga logperch (*Percina jenkinsi*) are rare fish species inhabiting the Conasauga River in northwest Georgia and southeast Tennessee. Both were listed by the Fish and Wildlife Service in 1985 as Endangered. As a result, the Tennessee Wildlife Resources Agency, Georgia Department of Natural Resources, and University of Georgia's Institute of Ecology/Museum of Natural History joined forces, with funding support from the U.S. Fish and Wildlife Service, to conduct the research needed for recovering these vulnerable species.

Both fishes occur in a limited reach of the upper Conasauga River; their designated Critical Habitat encompasses only 33 miles (54 kilometers) for the darter and 11.5 miles (18.5 km) for the logperch. This part of the river still has clear water and relatively silt-free shoals, whereas downstream sections have suffered from siltation and loss of streamside vegetation. Even in the upper Conasauga, however, riparian destruction and increased development within the watershed threaten the water quality.

The amber darter was discovered in a tributary of the Etowah River in northwest Georgia in 1948, but the construction of Allatoona Reservoir in the 1950's impounded this free-flowing habitat. Despite repeated surveys, only one amber darter has been found in the Etowah system in the past 10 years. In 1971, however, the species was discovered in the Conasauga River. Biologists have found that the darters are restricted to relatively fast riffles of moderate depth with swift currents along the channel bottom. Studies indicate that amber darters occur in water depths from 11 to 19 inches (29 to 49 centimeters) and that the average current velocity at the substrate ranged from 3 to 11 inches per second (7 to 27 cm/second). Although there are many such shoals within the river, amber darters are found in only a small percentage. No precise estimates of population size are available; however, survey data indicate that there are no more than 2 or 3 individuals per 1,100 square feet (100 square meters) within any given shoal. This indicates that the population could be at a critically low level.

Life history studies are being conducted to determine the darter's longevity, growth rates, and reproductive habits. Its spawning behavior has not been observed, and it is not known if juveniles require specific habitats. Tuberculate males have been observed between the months of December and May, suggesting that spawning occurs between late winter and spring. Efforts will be made to observe and record this behavior in detail.

The Conasauga logperch (described scientifically in 1985) also requires clear water, but it prefers deep, fast-flowing chutes and pools rather than shallow riffles. Before this study, the known range of the Conasauga logperch was restricted to 11.5 miles (18.5 km) of the river. Recent surveys, however, revealed that the logperch's range extends downstream an additional 12 miles (20 km). Although this is an encouraging discovery, the known population remains small.

Because of their low abundance and restricted ranges, both species are vulnerable to extinction from a single catastrophic event. Accordingly, recovery plans recommend considering the reestablishment of amber darters and Conasauga logperch in currently unoccupied historical habitat. Locating suitable reintroduction sites and developing management plans will require additional research, but we believe that such studies could help lead to the recovery of these endangered species.

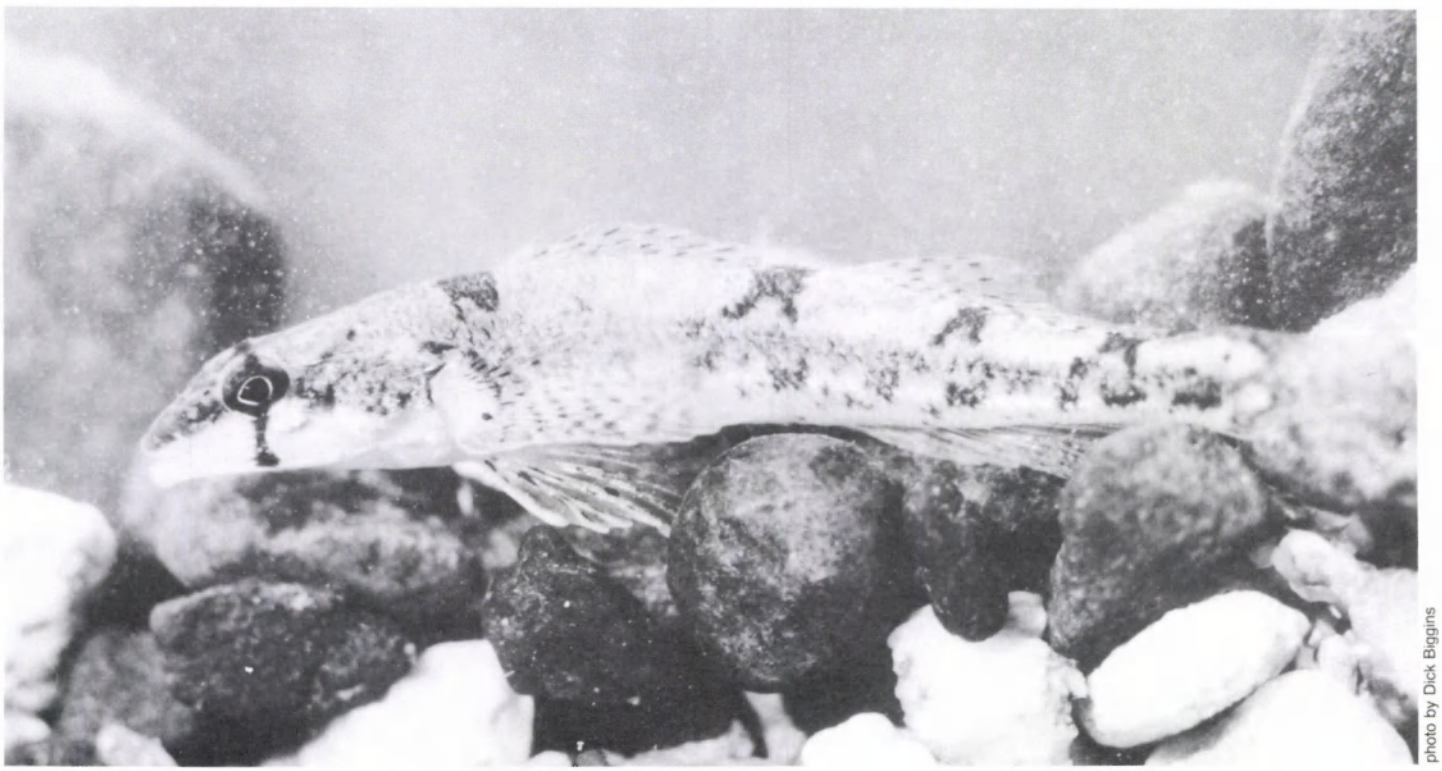

photo by Dick Biggins

Amber darters are slender fish generally less than 2.5 inches in length. They have a golden brown upper body, accented by dark, saddle-like markings, and a yellowish belly.

Mercury Contamination

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recorded mercury at 98 ppm in the panther's liver. Additional testing at the Service's Patuxent Wildlife Research Center laboratory revealed a concentration of 110 ppm.

As a result of these findings, liver and hair samples from other archived dead panthers, along with hair samples from live panthers, were analyzed. Mercury concentrations in the 10 liver samples analyzed ranged from 0.005 to 20.0 ppm, and 6 of the specimens contained mercury at levels of 7.8 ppm or higher. Mercury levels in hair samples from 10 panthers ranged from 0.02 to 130.0 ppm, and again 6 registered levels of over 7.8 ppm.

To address these problems, the Technical Subcommittee convened an ad hoc working group on November 7 and 8, 1989. The objectives were to discuss the significance of current information; to develop sampling plans to gain additional data; and to make specific recommendations for addressing mercury contamination problems.

Based on current information, the Technical Subcommittee has concluded that mercury contamination of the panther is potentially a serious threat. Panther #27 contained levels of mercury in her liver consistent with mercury toxicosis reported from laboratory experiments and from field observations of domestic cats. Although none of the elevated mercury levels documented in the other dead and live panthers analyzed were as high as those in panther #27, some were at levels high enough to be of concern.

The Technical Subcommittee also concluded that the Fakahatchee Strand and East Everglades areas appear to be hot spots for mercury contamination of panthers. The presumed source of the contamination is the panther's prey, particularly raccoons, which bioaccumulate mercury through the aquatic food web. Because both hot spots have low numbers of deer and hogs, which are important prey species for the panthers, there is a higher than normal predation of small mammals, such as raccoons, in these areas. The reproductive success of female panthers is lower in areas where small prey is the predominant food source. This may be the result of poor nutrition, but mercury contamination also may be affecting reproduction.

The Technical Subcommittee raised several concerns about three living panthers. One male panther (#16) had highly elevated levels of mercury in hair and blood samples collected in February 1988. Two others (#9 and #23) have the same prey base (primarily raccoons) as #27 and consequently may be at risk for mercury poisoning as well.

To address this situation, the Committee recommended in January 1990 to 1) accelerate the routine testing of panthers in the wild, 2) establish an action level of 1.4 ppm for whole blood in panthers, 3) take action to better identify problem areas and contaminated prey resources, and 4) increase the populations of uncontaminated prey through habitat management and harvest regulations. The Committee also recommended screening panthers for other potential pollutants, including other metals, organochlorines, and PCB's, and supporting efforts to identify and rectify the source of mercury contamination.

Regional News

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(*Canis lupus*) management program. Alberta's wolf population is stable or slightly declining, with about 500 wolves being taken annually by trappers, hunters, and landowners. Controlling problem wolves is an important element of Alberta's program. Gunson stated that it is important to initiate a public information program on wolves and their management in order to gain support for wolf recovery efforts.

In response to protests, British Columbia, Canada, authorities called off a proposed wolf hunt just north of Glacier National Park, Montana, last fall. Although the Glacier National Park pack did not successfully raise pups this year, a pack just a few miles north of the border did. This area may be a source of dispersing wolves for central Idaho.

The Central Idaho Wolf Recovery Committee will shortly publish an annual report on wolf activity in central Idaho. Printouts of all probable wolf sightings for the past 10 years will be sent to the U.S. Forest Service, Bureau of Land Management, and Idaho Fish and Game Department district offices. The Committee also is working with the Public Policy Analysis Group of the University of Idaho in preparing a public survey of Idaho residents' attitudes on natural resource issues. Questions on wolf recovery may be included in the survey.

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The Service is nearing completion of its negotiations with the Environmental Protection Agency (EPA) on an international sewage project proposed for construction near the U.S./Mexico border, not far from the Pacific Ocean. The project is being funded by the EPA to handle both the Tijuana, Mexico, sewage that is flowing into the U.S. and sewage expected from future growth in the San Diego, California, area. Two Endangered birds, the light-footed clapper rail (*Rallus longirostris levipes*) and the least Bell's vireo (*Vireo bellii pusillus*) could be affected by the project.

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Section 7 consultations continue over the potential effects of the proposed Brown Creek timber sale on grizzly bears (*Ursus arctos*) in the Idaho panhandle national forests. The timber sale is under appeal by the National Wildlife Federation and involves bear habitat managed by the U.S. Forest Service, Washington-Idaho Forest Industries, and Idaho Department of Lands. The Fish and Wildlife Service's Boise Field Station has been attempting to get the parties to reach a settlement via Section 7 consultation and Interagency Grizzly Bear Committee involvement.

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photo by B. Moose Peterson

least Bell's vireo

Regional News

(continued from previous page)

Plans are being made for Idaho's third transplant of Endangered woodland caribou (*Rangifer tarandus caribou*) this spring. It is hoped that 24 caribou will be added to the existing 50 to 60 caribou in the Selkirk Mountains. Students from the University of Idaho are continuing to study caribou habitat. This information will assist the Service with Section 7 consultations and help other land managers with planning activities in caribou habitat. The International Mountain Caribou Technical Committee is revising sections of the recovery plan, which is due for an update in fiscal year 1990.

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The Service's Boise Field Offfice has completed negotiations for a 3-year conservation agreement to protect habitat of the Bruneau Hot Springs snail, which has been proposed for listing as an Endangered species (see BULLETIN Vol. X, No. 9). The agreement provides for fencing to protect the spring's riparian zone from livestock use, and provides unrestricted access to the property by Service staff and cooperators in scientific investigations of the species.

Dr. Robert Hershler of the Smithsonian Institution is preparing a scientific description of this snail in the family Hydrobiidae. The species description should be published later this year. Life history research on the snail also is being conducted by biologists at Idaho State University.

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Region 2—Endangered interior least terns (*Sterna antillarum*) returning from Latin America to nest in the Tulsa, Oklahoma, area this April will find that additional segments of their breeding habitat along the Arkansas River have been protected. Two Tulsa companies have signed memoranda of understanding with The Nature Conservancy to try to protect river bottom habitat, and a private real estate investor has donated river bottom parcels (valued at $1,000 per acre) to the Arkansas River Least Tern Preserve. These agreements and donations bring the total protected area in the preserve up to approximately 1,000 acres (400 hectares) within 9 river miles (14 kilometers). Additional areas may be acquired before the terns return.

The Arkansas River Least Tern Preserve was established in 1986 by the Conservancy, with assistance from the Service's Tulsa Field Office and the Tulsa Audubon Society. A committee consisting of the Conservancy, Service, Audubon Society, Oklahoma Department of Wildlife Conservation, Oklahoma Ornithological Society, Tulsa River Parks Authority, and Army Corps of Engineers manages the preserve and works to increase public awareness. Last year, 50 tern chicks fledged within the preserve, and their story made local and regional television, newspaper, and radio news 38 times—a 100 percent increase in annual media coverage since 1986. The preserve has produced a 3-year average of 1.5 fledglings per breeding pair, compared to 0.5 elsewhere on the river. In addition, the preserve provides habitat for migrating piping plovers (*Charadrius melodus*) and peregrine falcons (*Falco peregrinus*), and wintering bald eagles (*Haliaeetus leucocephalus*).

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Region 4—Three additional State agencies in Region 4 are developing Endangered Species Act-Section 6 cooperative agreements with the Service. The Mississippi Department of Wildlife, Fisheries and Parks already has an agreement for animals, but it now has approval from the State to develop an agreement for plants. In fiscal year 1989, the Alabama Department of Conservation and Natural Resources and the Louisiana Department of Wildlife and Fisheries agreed to begin developing agreements for animals. Agreements from the agencies are expected early in fiscal year 1990. Neither agency, however, has State legislative authority to enter into cooperative agreements for plants.

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The Missouri Department of Conservation has notified the Service's Jackson, Mississippi, Field Office of new sightings of the Threatened Ozark cavefish (*Amblyopsis rosae*) in Missouri. In 1989, the presence of cavefish in Jackson Cave (Greene County) was confirmed by Dr. Steven Jones of Drury College. Another population was found in Hayes Spring Cave (Stone County). Although this population is located within the historic range of the cavefish, it is the only currently known population in Stone County. It was believed that the cavefish had been extirpated from Fantastic Caverns (Greene County), but a single cavefish was observed there in 1989. This marks the first time the species has been observed in the caverns since 1981. Finally, in January of 1990, cavefish were observed in a spring at the Neosho National Fish Hatchery at Neosho, Missouri. There are now 9 known populations of the Ozark cavefish in Missouri and 21 populations rangewide.

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The Fish and Wildlife Service's Asheville, North Carolina, Field Office has worked with the U.S. Forest Service to draft guidelines for the management of the Carolina northern flying squirrel (*Glaucomys sabrinus coloratus*) on national forests in North Carolina and Tennessee. Once adopted by the Forest Service, these guidelines should aid in the recovery of this Endangered squirrel.

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Biologists from the Asheville Office, in cooperation with the U.S. Forest Service and the North Carolina Plant Conservation Program, have developed a 10-year management plan for the mountain golden heather (*Hudsonia montana*). This Threatened plant occurs at only two locations, both of which are managed by the Forest Service. Previous experimental work with this species has indicated that fire suppression is adversely affecting the plant, especially within the Linville Gorge Wilderness, by allowing the encroachment of competing vegetation. Prescribed burning will be the primary management tool used to recover the plant.

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Region 6—A memorandum of understanding for the study and management of bald eagles in the Greater Yellowstone Ecosystem in northwestern Wyoming was recently agreed upon by the Wyoming Game and Fish Department; Montana Department of Fish, Wildlife and Parks; Idaho Department of Fish and Game; U.S. Fish and Wildlife Service; U.S. Forest Service; National Park Service; Bureau of Land Management; and Bureau of Reclamation. The agreement should make it easier for agencies to prioritize research projects and to direct funding, ultimately increasing the agencies' ability to maintain a viable bald eagle population in the Yellowstone region. Most of the nesting bald eagles in Wyoming are found in this area.

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A 1-year old male whooping crane (*Grus americana*) was found dead on October 31, 1989, after hitting a powerline near McCook, Nebraska. The bird was killed while migrating from Canada to the Texas Gulf Coast. The Service met with the company that owns the powerline and discussed its responsibilities under the Endangered Species Act and ways to avoid collision deaths in the future. The Service requested the power company, as well as all other power companies in Nebraska, to attend an educational seminar on the problem of bird collisions with powerlines.

The seminar, hosted by the Service's Grand Island, Nebraska, Field Office, was held on January 18, 1990, and was attended by 37 of the 41 Nebraska public power companies. The companies requested that the Service identify specific mortality sites and mitigation measures to enhance the visibility of the powerlines to birds in flight. The companies in turn agreed to take appropriate actions to reduce the problem of powerline mortality. It is estimated that 2.5 to 3 million birds die each year in the United States as a result of collisions with manmade objects.

* * *

Region 8—Biochemical analyses of tissues from 72 Minnesota gray wolves (*Canis lupus*) indicated that more than 50 percent may contain mitochondrial DNA from coyotes (*Canis latrans*). If this is true, these hybrids can only be the result of male gray wolves mating with female coyotes. This has serious implications for the conservation of pure gray wolves in Minnesota.

* * *

Regional News

(continued from page 7)

To provide more rapid processing of post-mortem results for endangered animals and expedite the development of summary data reports on endangered species mortality, the Service's National Wildlife Health Research Center in Madison, Wisconsin, has assigned Ron Windingstad to serve as a liaison with field biologists, endangered species coordinators, and law enforcement agents. Ron will be working closely with Dr. Nancy Thomas, the primary pathologist for endangered species and law enforcement cases. Individuals needing information or advice regarding diseases in endangered species should contact Ron at FTS 364-5411 or 608/271-4640.

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Region 9—The Service's Division of Endangered Species and Habitat Conservation (EHC) has released a new regional wetland flora document, "National List of Plant Species That Occur in Wetlands: Caribbean (Region C)." Although this regional list was designed specifically for wetlands in Puerto Rico and the U.S. Virgin Islands, it has utility throughout the Caribbean Basin and parts of Central America. EHC staff, working with the Service's Office of International Affairs, has distributed over 180 copies of the list to researchers and wetland managers in 19 countries.

The Caribbean list is one of many regional wetland flora documents published by the Service in cooperation with the National and Regional Interagency Review Panels. These panels consist of representatives from the Service, Army Corps of Engineers, Environmental Protection Agency, and Soil Conservation Service. Copies of the Caribbean and the 12 other regional wetlands inventory plant lists can be ordered from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161 (telephone 703/487-4650). Plants lists for each individual State also are available.

BOX SCORE
LISTINGS AND RECOVERY PLANS

Category	ENDANGERED U.S.	ENDANGERED Foreign Only	THREATENED U.S.	THREATENED Foreign Only	LISTED SPECIES TOTAL	SPECIES WITH PLANS
Mammals	51	241	8	23	323	25
Birds	75	145	10	0	230	59
Reptiles	16	59	17	14	106	23
Amphibians	6	8	5	0	19	5
Fishes	51	11	31	0	93	47
Snails	3	1	6	0	10	7
Clams	34	2	0	0	36	23
Crustaceans	8	0	1	0	9	4
Insects	11	1	7	0	19	12
Arachnids	3	0	0	0	3	0
Plants	169	1	53	2	225	102
TOTAL	427	469	138	39	1073*	307 **

Total U.S. Endangered **427** (258 animals, 169 plants)
Total U.S. Threatened **138** (85 animals, 53 plants)
Total U.S. Listed **565** (343 animals, 222 plants)

*Separate populations of a species that are listed both as Endangered and Threatened are tallied twice. Those species are the leopard, gray wolf, grizzly bear, bald eagle, piping plover, roseate tern, Nile crocodile, green sea turtle, and olive ridley sea turtle. For the purposes of the Endangered Species Act, the term "species" can mean a species, subspecies, or distinct vertebrate population. Several entries also represent entire genera or even families.

**There are 256 recovery plans approved. Some recovery plans cover more than one species, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

Number of Cooperative Agreements signed with States and Territories: 51 fish & wildlife
36 plants

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ENDANGERED SPECIES

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